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ABSTRACT

The role of educational research is examined, focusing on its relationship to the classroom teacher's efforts to promote student learning. After a discussion of the relationship between education and psychology, the individual roles of educational research are discussed; the latter include increasing and disseminating knowledge and assessing student performance. Seven criteria for avoiding failure to use research and evaluative information are discussed; these criteria are associated with historical relevance, the diagnosis of a specific problem, environmental support, organizational structure and individual attitudes, manipulability of the factor, political and economic feasibility, and effectiveness. In order to be more effective in impressing the importance of research upon policymakers and practitioners, researchers must make a better effort to understand cognition or the "action frames of mind" of such potential research users. (TJH)

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Educational Research

Introduction

Wiersma (1985) has said that the overall function or goal of educational research is the improvement of the educational process. Educational research can be defined in a number of ways depending on the perspectives of the individuals or groups involved in the educational process. Educational research may be classified as basic or applied. Basic research is primarily concerned with extending knowledge. In contrast, applied research focuses on solving immediate problems of practical importance (Wiersma, 1985).

Educational research endeavors may also be defined in terms of the methods employed or the types of research design utilized. Various educational research textbooks offer slightly different classifications. Moore (1983) has suggested experimental, quasi-experimental, descriptive, single-subject, historical, and meta-analysis.

Russell (1988) provided the following explanation of what constitutes educational research:

> The university-based researcher is likely to answer that it is the systematic investigation of significant educational questions in a search for generalizable knowledge. School administrators would likely be more oriented toward the generation of information and procedures for organizational problem solving. Policymakers may look to educational research to provide data and analyses on policy options. The challenge, of course, is for the behavioral and social sciences to garner support from these publics, each of whom weighs the worth of research on a different scale. (p. 5)

Shavelson and Berliner (1988) have stated that "a broad understanding of the research endeavor" involves a recognition of the "full range of research that can be of high quality, whether or not that research leads immediately to school improvement" (p. 10). They view the scope of educational research as that which

> (a) ranges from basic to applied to policy;
> (b) focuses on the individual psyche, on small groups, on organizational alternatives, and on international comparisons;
> (c) employs qualitative methods, large-scale causal modeling, or randomized laboratory experiments; and
> (d) focuses on the long-term development of knowledge as well as on short-term "fixes." (p. 10)

They stated further that "a long-term view of the research endeavor, together with a mixed portfolio of projects representing a wide range of substantive and methodological alternatives, is essential" (p. 10).

Educational research can also be discussed in terms of its relationship to other relevant fields such as psychology, its role (with an emphasis on ways in which findings can assist the classroom teacher in promoting student learning), and comments on its contributions. These are the topics to be addressed.

The Relationship Between Education and Psychology

In his paper addressing research on learning and schooling, Robert Glaser (1978) indicated that earlier on, close ties existed between "science and its application to education" (p. 3), citing the works of John Dewey and Edward Thorndike as examples. Shortly following this era, education and psychology seemed to split as psychologists, particularly experimental

psychologists, directed their work more toward laboratory settings and theoretical issues than to situations that had relevance for education. As Glaser indicated, however, this trend changed in the early 60's as psychologists again began "turning their enterprise to analyses and investigations useful to the study of the instructional process" (p. 4). Not only is there greater unity, but the relationship has been strengthened by a more advanced science.

Robert Travers (1983), in discussing recent trends and the future in educational research, opened with the following remarks:

> Educational research since midcentury has changed for at least two major reasons. First, it has changed because of the intervention of government. This intervention has resulted both in increasing funding and a change in the locus of control. Second, educational research has changed because the outstanding figures in psychology who influenced the course of research in the first half of the century have faded into history. New figures have emerged, with new concepts of the nature of the human. Some influence still lingers from Thorndike, Judd, Terman, and the other leaders of earlier times, and some of the influences they have left with us have become engraved on the schools, but there are new figures with new influences. The central and influential ideas of psychology have changed and, indirectly, produced changes in educational research. (p. 531)

An excellent example of the point Travers was making can be found in a recent discussion of the importance of teaching learning strategies to children; that is, giving as much attention to the <u>processes</u> of learning as to the <u>products</u> of learning. In presenting a conceptual framework for their discussion, the authors stated the following:

> An interest in learning strategies is the natural outgrowth of a change in orientation from behaviorist theories to cognitive theories of learning. The behaviorist (or S-R) approach to learning--as developed from the work of Hull and Spence and Skinner--focuses on how presentation of material influences behavior. As Farnham-Diggory (1977) points out, this S-R approach is based on the idea that "a stimulus goes in, a response comes out, and what happens in between is summarized by a hyphen" (p. 128).
> In contrast, the cognitive approach to learning seeks to understand how incoming information is processed and structured in memory. Farnham-Diggory (1977) notes that "with the emergence of cognitive psychology in the 1960's . . . now, instead of a hyphen, we have mental structures and processes" (p. 128). (Weinstein & Mayer, 1977, p. 316)

The Role of Educational Research

Educational researchers have as their audiences and clients a wide variety of groups. Kean (1983) identified and discussed the needs of the following list of clients and audiences:

- School Superintendents
- Deputy, Associate, and Assistant Superintendents
- District Superintendents
- Principals
- Teachers
- Instructional Supervisors
- Project Managers
- The Office of Funded Programs
- The Office of State Subsidies (Reimbursable Programs)
- Program Directors
- The Board of Education
- Unions
- Parent Groups
- Individual Citizens
- Community Groups
- City Government
- Government Agencies
- Colleges and Universities
- Outside Research Groups
- Individual Researchers
- The media
- Students (pp. 373-377)

As Kean (1983) suggested, the diversity of these clients and audiences in terms of their sophistication, needs, interests, and

perspectives can often result in conflicting demands.

These potential conflicts aside, the client or audience of particular interest within the present context is the teacher. What is the role of the educational researcher in assisting the classroom teacher in promoting student learning on a daily basis? In particular, what kinds of activities does the educational researcher engage in to provide such assistance? In Kean's (1983) view, "Teachers should be provided with test score information and information on any programs they have operating within their classrooms. In addition, special services such as scoring of teacher-made tests might also be made available upon request" (p. 374). Worthen (1975) identified a set of 25 competencies and tasks that should be either possessed by or available to individuals or groups conducting research and evaluation. They will not be enumerated here, but readers familiar with the competencies Worthen identified will be able to see the correspondence between that set of tasks and the responsibilities discussed in the sections that follow.

Increasing and Disseminating Knowledge

According to Kean (1983), part of the educational researcher's responsibility to classroom teachers is to provide information concerning programs in operation within their classrooms. This notion can be expanded to include providing information on proposed programs, strategies, and processes and aiding in the interpretation of relevant research findings. As Wiersma (1985) pointed out, "the problems associated with the

development, operation and improvement of educational systems must be met with extensive and systematic applications of knowledge" (pp. 21-22). He went on to assert the need for individuals at all levels to be "consumers of research findings" and "active participant(s) in research studies" (p. 22). Thus, educational researchers have an obligation both to advance knowledge by conducting studies and disseminating results, and to help teachers and others understand the relevance of previous research.

In addition to contributing to the numerous journals and other publications that report the results of specific studies or describe particular programs or activities and make available previous research on a variety of topics in education, educational researchers, among others, periodically produce writings that synthesize research findings. Typically these writings present current or changing thinking about given educational issues based on the accumulation of research results. One such effort is the Handbook of Research on Teaching (Third Edition) (Wittrock, 1986). Among the many issues addressed in that publication are the teaching of learning strategies, teacher behavior and student achievement, school effects, teaching creative and gifted learners, and teaching reading. Each chapter offers a discussion of a specific area of interest including supporting research.

Educational research findings frequently have been criticized as being contradictory or unclear or difficult to

understand, as suggested by the following statements: "There's so much research it often seems contradictory. I just can't figure out what's important and what isn't." "I don't see how research can help improve my teaching--it's all too vague and abstract" (Squires, Huitt, & Segars, 1983, p. 9). "It's too theoretical, too general! What does it say that helps my situation?" (Schubert, 1980, p. 17).

In an effort to respond to such criticisms, various attempts have been made to publish research results in a form that is more easily understood and more readily translatable into practice. One example is the publication just mentioned. Another example of such a publication is a booklet produced by the United States Department of Education titled What Works: Research about Teaching and Learning (1986).

In the introduction to What Works, Dr. Chester E. Finn lauded the efforts of the Department of Education to make "information and knowledge accessible to people who might benefit from them" (p.1). He further indicated that the intent of the publication was to include "only those findings about which research evidence and expert opinion were consistent, persuasive, and fairly stable over time" (p. 1). Following each research finding, several comments in support of the finding are offered, followed by a listing of four or five relevant references.

As with many such publications, What Works is not without its critics. Glass (1987) labeled it an expression of conservative philosophy and conservative educational policy. His

contention was that it not only included findings that many experts would not necessarily accept as "conclusively established" (p. 7), but it also omitted important findings in such areas as computer-assisted instruction and early childhood education. An important point to be made here is that at all levels, educational researchers, educators, administrators and others involved in the educational process must be not just "consumers of research findings," as Wiersma (1985, p. 22) acknowledged; each must also become a critical, discriminating consumer.

Assessing Student Performance

A second major responsibility of educational researchers focuses on student performance assessment. Discussing a 1979 study by Lyon and Doscher, Kean (1983) stated that of nearly 500 school districts included in the study, three-fourths of the districts with offices of evaluation indicated that the majority of their data collection effort consisted chiefly of collecting student achievement data. Neill and Medina (1989), commenting a study conducted by the National Center for Fair and Open Testing, stated that an estimated 105 million standardized tests were administered in U.S. public schools in 1986-87 to approximately 40 million students. The construction, validation, and evaluation of these tests, as well as the reporting, interpretation, and use of their results, are among the testing-related issues with which educational researchers must deal.

Some groups demand accountability evidence on the part of

the schools in the form of student achievement results. Gallup and Elam (1989) reported that 77% of respondents in a recent national survey would favor national standardized tests to measure student achievement. Other factions insist that the testing done in the schools is harmful to education. Educational researchers must respond to both camps by providing a sound rationale for the testing that is conducted and the tests that are constructed and by providing users of test results with the kinds of information that will ensure the appropriate use of those results and prevent their misuse or abuse. Anyone involved with testing issues at any level should be familiar with the Standards for Educational and Psychological Testing (AERA, APA, NCME, 1985), which specify guidelines for the construction, evaluation, and use of tests.

When it comes to helping teachers promote student learning, the educational researcher, especially one working within a school district, may assume a number of responsibilities. One such responsibility is the interpretation of test results. In today's schools, students are often given both norm-referenced and criterion referenced achievement tests, and many school systems also administer some form of group ability test.

Norm-referenced achievement test results are reported to schools in a variety of formats offering a number of different kinds of scores. Typically a teacher will receive results for his or her class with individual scores for each student and group averages. Scores may be reported as grade equivalents,

percentile ranks, stanines and normal curve equivalents among others. In addition to comprehensive scores, students may receive scores on clusters or subtests. Teachers need to understand not only what each different kind of score means but also what kinds of learning the test as a whole and the subtests or clusters are measuring or are purported to measure before they can translate the results into efforts to improve learning.

Criterion-referenced test results typically are more readily understood and interpreted. They are often reported in terms of the percentage of a group of students achieving an objective. In the case of an individual student, results usually include an indication of the objectives achieved or not achieved. Teachers find these results more easily translatable into activities to improve learning.

In addition to administering system-wide and state-wide mandated tests, teachers frequently develop and administer their own assessments. These may take many forms from the very informal to the more formal, and they may be either summative or formative in nature. Often these assessments provide more information more about a student's progress on a daily basis. With respect to such teacher-made instruments, the educational researcher can play a vital role in providing the teacher with guidance on item construction, test format, and analysis of results (for example, interpreting item response choice distributions on a multiple choice test). With such information, teachers can become better equipped to prepare assessments that

are valid and reliable measures of student performance.

Evaluating Programs

A third major role of the educational researcher is that of program evaluation. The Joint Committee on Standards for Educational Evaluation (1981), in developing Standards for Evaluations of Educational Programs, Projects, and Materials, was "guided by the assumption that evaluation is an inevitable part of any human undertaking and by the belief that sound evaluation can promote the understanding and improvement of education" (p. 5). Moore (1983) explained that the intent of an evaluation study is to "determine the advantages and disadvantages of a particular education program, process, or product in terms of specific objects and criteria for evaluation. Evaluation projects seek conclusions which lead to recommendations and decisions" (p. 338). Stufflebeam and Webster (1983) defined the evaluation study as "one that is designed and conducted to assist some audience to judge and improve the worth of some educational object" (p. 24), but they noted that some studies purported to be educational evaluations fail to conform to this definition.

Stufflebeam and Webster (1983) identified 13 different types of evaluation studies and classified them according to three main approaches. The first, which they referred to as politically oriented evaluations (pseudo-evaluations), are so called because they "promote a positive or negative view of an object, irrespective of its actual worth" (p. 24). These include politically controlled studies and public relations-inspired

studies.

Questions-oriented studies (quasi-evaluations) are aptly named because their main purpose is to answer specific questions and not necessarily to judge the worth of an object. The five types of studies included here are objectives-based studies, accountability studies, experimental research studies, testing programs, and management information systems.

Values-oriented studies (true evaluations) "are designed primarily to assess and/or improve the worth of some object" (p. 24). Six types of studies fall into this classification. They include accreditation/certification studies, policy studies, decision-oriented studies, consumer-oriented studies, client-centered studies, and connoisseur-based studies.

Each of the 13 types of studies was examined by the authors in terms of seven descriptors:

> (1) advance organizers, that is, the main cues that evaluators use to set up a study;
> (2) the main purpose served;
> (3) the sources of questions that are addressed;
> (4) the questions that are characteristic of each study type;
> (5) the methods that are typically used;
> (6) the persons who pioneered in conceptualizing each study type; and
> (7) other persons who have extended development and use of each study type. (p. 25)

Based upon the kinds of questions addressed by the various types of studies, those of most immediate interest to teachers would be the five questions-oriented studies (although the other types of studies might certainly have an impact on teachers and students and the kinds of programs implemented in their schools).

The five questions-oriented studies and the questions they typically address are as follows:

> Objectives-based studies - Which students achieved which objectives?
> Accountability studies - Are those persons and organizations charged with responsibility achieving all they should achieve?
> Experimental research studies - What are the effects of a given intervention on specified outcome variables?
> Testing programs - Is the test performance of individual students at or above the average performance of the norm group?
> Management information systems - Are program activities being implemented on schedule, at a reasonable cost, and with expected results? (p. 38)

The Contributions of Educational Research

As was mentioned earlier, there are those who would criticize educational research findings for being too abstract or vague and would assert that a greater effort needs to be made to gear research more toward a focus on practice. Others would argue that not all of educational research has the goal of immediate change. As Shavelson and Berliner (1988) indicated research should focus on long-term development of knowledge as well as immediate effects. Shavelson (1988) stated the following:

> I want to make clear that education research can be justified as legitimate inquiry in its own right. We do not have to prove its worth on the basis of improving educational practice. We justifiably pursue, for example, the fundamental nature of intelligence, as well as its implications for instruction and testing. Indeed, most of education research bears on theory or a particular line of inquiry, <u>as it should</u>. . . . When we claim, however, that research contributes to policy or practice, the criterion for evaluating this claim changes. Our findings or recommendations should fit within and inform the mind frames of policymakers or practitioners. (p. 10)

But when research results are intended for immediate practical use, why are they not used? In a video presentation by the Association for Supervision and Curriculum Development (1983), it was suggested that only 5% of teachers will ultimately implement any given set of new strategies. The reason given by the teachers was that the classroom is a busy place and that as much as they intend to implement new strategies, they get "swallowed up" in classroom activities and forget to try new things.

Kean (1983) provided seven "criteria for averting failure to utilize research and evaluative information" (p. 394). They are as follows:

> 1. Diagnosis of the specific problem. Has some form of needs assessment been undertaken so that the particular policy area being considered has first been established as a problem in need of a solution?
> 2. Historical relevance. Is there a fit between the recommended change and the (internal) traditions of the organization?
> 3. Environmental support. Is there a fit between the recommended change and what is acceptable to outside (external) forces?
> 4. Organizational structure and individual attitudes. Does the recommended change provide for the meshing of the needs of the organization and the needs of the individual?
> 5. Manipulability of the factor. Is the factor or variable manipulable? Is it within the realm of the organization to change it?
> 6. Political and economic feasibility. Can the proposed change be implemented within the realm of the political structure of the organization and economic constraints within which it functions?
> 7. Effectiveness. Is the proposed change an appropriate solution to the problem? (p. 394)

As a number of writers have pointed out, educational research has indeed make important contributions to the

improvement of education and directly or indirectly assisted teachers in promoting student learning. Shavelson and Berliner (1988), for example, identified three major contributions. They stated the following:

> The eight concepts underlying effective schools--clear school mission; effective instructional leadership and practices; high expectations; safe, orderly, and positive school environment; ongoing curriculum improvement; maximum use of instructional time; frequent monitoring of student progress; and positive home-school-community relations--have given school systems a set of goals to work toward; a sense of mission. . . . The research, development and validation of cooperative learning have benefitted thousands of youngsters. . . . In psychometrics, for example, generalizability theory and item response theory have significantly influenced testing. (p. 9)

The extent of the contributions of educational research can be seen quite clearly by an examination of the table that follows. It constitutes a summary of a review of research conducted during the 1970's on instruction and related areas, as well as results of that research.

Table 1. A Selective Summary of a Decade of Educational Research

Research Topics	No. of Results	Percent Positive
Time on learning	25	96.0
Innovative curricula on:		
Innovative learning	45	97.8
Traditional learning	14	35.7
Smaller classes on learning:		
Pre-1954 studies	53	66.0
Pre-1954 better studies	19	84.2
Post-1954 studies	11	72.7
All comparisons	691	60.0
Behavioral instruction on:		
Learning	52	98.1
"Personalized Systems of Instruction" on learning	103	93.2
Mastery learning	30	96.7
Programmed instruction on learning	57	80.7
Adjunct questions on learning:		
After text on recall	38	97.4
After text on transfer	35	74.3
Before text on recall	13	76.9
Before text on transfer	17	23.5
Advance organizers on learning	32	37.5
Analytic revision of instruction on achievement	4	100.0
Direct instruction on achievement	4	100.0
Lecture versus discussion on:		
Achievement	16	68.8
Retention	7	100.0
Attitudes	8	86.0
Student- versus instructor-centered discussion on:		
Achievement	7	57.1
Understanding	6	83.0
Attitude	22	100.0
Student- versus instructor-led discussion on:		
Achievement	10	100.0
Attitude	11	100.0
Factual versus conceptual questions on achievement	4	100.0
Specific teaching traits on achievement:		
Clarity	7	100.0
Flexibility	4	100.0
Enthusiasm	5	100.0
Task orientation	7	85.7
Use of student ideas	8	87.5
Indirectness	6	83.3
Structuring	3	100.0
Sparing criticism	17	70.6
Psychological incentives and engagement		
Teacher's cues to student	10	100.00
Teacher reinforcement of student	16	87.5
Teacher engagement of class in lesson	6	100.00
Individual student engagement in lesson	15	100.0
Open versus traditional education on:		
Achievement	26	54.8
Creativity	12	100.0
Self-concept	17	88.2
Attitude toward school	25	92.0
Curiosity	6	100.0
Self-determination	7	85.7
Independence	19	94.7
Freedom from anxiety	8	37.5
Cooperation	6	100.0
Social-psychological climate and learning:		
Cohesiveness	17	85.7
Satisfaction	17	100.0
Difficulty	16	86.7
Formality	17	64.7
Goal direction	15	73.3
Democracy	14	84.6
Environment	15	85.7
Speed	14	53.8
Diversity	14	30.8
Competition	9	66.7
Friction	17	0.0
Cliqueness	13	8.3
Apathy	15	14.3
Disorganization	17	6.3
Favoritism	13	10.0
Motivation and learning	232	97.8
Social class and learning	620	97.6
Home environment on:		
Verbal achievement	30	100.0
Math achievement	22	100.0
Intelligence	20	100.0
Reading gains	6	100.0
Ability	8	100.0

(Reproduced from Walberg, Schiller, & Haertel, 1979, p. 30)

Concluding Remarks

The role of educational research has been examined, particularly as it relates to the classroom teacher's efforts to promote student learning. The contributions of educational research, although viewed by some critics as unclear, inconclusive, or insignificant, have indeed had a significant impact on the educational process. Examples of some of the important contributions, as identified by others, have been presented.

If, in fact, educational research has made valuable contributions and yet there is still the perception that the opposite is true, then Russell (1988) and Shavelson (1988) have the right idea about what must be done. Shavelson (1988) has suggested that we must make an effort to better understand the "cognition" or the "action mind frames" of policymakers and practitioners (pp. 4-5). Russell (1988) offered the following challenge:

> Researchers need to cultivate, in careful and sustained ways, the communication of research and identify more reliable channels for reaching their several constituencies. Research, as fundamental to educational improvement, has not systematically and forcefully presented its case as a national priority. Perhaps key to this undertaking should be well-organized efforts of talented people to present and demonstrate the results of research to the teaching profession. Researchers and teachers must pursue, in mutually respectful and intellectually challenging ways, exchanges that allow them to assimilate each other's knowledge and experience. (p. 5)

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